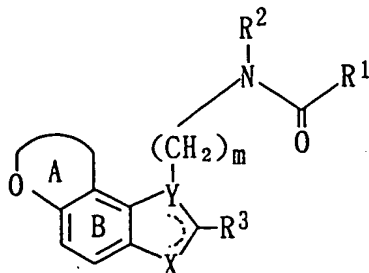


We claim:

1. A compound of the formula:



wherein  $R^1$  represents an optionally substituted hydrocarbon group, an optionally substituted amino group or an optionally substituted heterocyclic group;  $R^2$  represents a hydrogen atom or an optionally substituted hydrocarbon group;  $R^3$  represents a hydrogen atom, an optionally substituted hydrocarbon group, or an optionally substituted heterocyclic group; X represents  $CHR^4$ ,  $NR^4$ , O or S in which  $R^4$  represents a hydrogen atom or an optionally substituted hydrocarbon group; Y represents C, CH or N, provided that when X is  $CH_2$ , Y is C or CH; ..... represents a single bond or a double bond; ring A represents an optionally substituted, 5- to 7-membered oxygen-containing heterocyclic ring; ring B represents an optionally substituted benzene ring; and m represents an integer of 1 to 4, or a salt thereof.

2. A compound as claimed in claim 1, wherein  $R^1$  is (i) a  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $C_{3-6}$  cycloalkyl or  $C_{6-14}$  aryl group which may be substituted by 1 to 5 substituents selected from the group consisting of a halogen, nitro, cyano, hydroxy, an

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optionally halogenated  $C_{1-6}$  alkyl,  $C_{1-6}$  alkoxy, amino, mono- $C_{1-6}$  alkylamino, di- $C_{1-6}$  alkylamino, carboxyl,  $C_{1-6}$  alkyl-carbonyl,  $C_{1-6}$  alkoxy-carbonyl, carbamoyl, mono- $C_{1-6}$  alkylcarbamoyl, di- $C_{1-6}$  alkylcarbamoyl,  $C_{6-10}$  aryl-carbamoyl,  $C_{6-10}$  aryl,  $C_{6-10}$  aryloxy and an optionally halogenated  $C_{1-6}$  alkyl-carbonylamino,

(ii) an amino group which may be substituted by 1 or 2 substituents selected from the group consisting of a  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $C_{3-6}$  cycloalkyl and  $C_{6-14}$  aryl group, each of which may be substituted by 1 to 5 substituents selected from the group consisting of a halogen, nitro, cyano, hydroxy, an optionally halogenated  $C_{1-6}$  alkyl,  $C_{1-6}$  alkoxy, amino, mono- $C_{1-6}$  alkylamino, di- $C_{1-6}$  alkylamino, carboxyl,  $C_{1-6}$  alkyl-carbonyl,  $C_{1-6}$  alkoxy-carbonyl, carbamoyl, mono- $C_{1-6}$  alkyl-carbamoyl, di- $C_{1-6}$  alkyl-carbamoyl,  $C_{6-10}$  aryl-carbamoyl,  $C_{6-10}$  aryl,  $C_{6-10}$  aryloxy and an optionally halogenated  $C_{1-6}$  alkyl-carbonylamino, or

(iii) a 5- to 14-membered heterocyclic group containing, besides carbon atoms, 1 to 3 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, which group may be substituted by 1 to 5 substituents selected from the group consisting of a halogen,  $C_{1-6}$  alkyl,  $C_{3-6}$  cycloalkyl,  $C_{2-6}$  alkynyl,  $C_{2-6}$  alkenyl,  $C_{7-11}$  aralkyl,  $C_{6-10}$  aryl,  $C_{1-6}$  alkoxy,  $C_{6-10}$  aryloxy, formyl,  $C_{1-6}$  alkyl-carbonyl,  $C_{6-10}$  aryl-carbonyl, formyloxy,  $C_{1-6}$  alkyl-carbonyloxy,  $C_{6-10}$  aryl-carbonyloxy, carboxyl,  $C_{1-6}$  alkoxy-carbonyl,  $C_{7-11}$  aralkyloxy-carbonyl, carbamoyl, an optionally halogenated  $C_{1-4}$  alkyl, oxo, amidino, imino, amino, mono- $C_{1-4}$  alkylamino, di- $C_{1-4}$  alkylamino, 3- to 6-membered cyclic amino,  $C_{1-3}$  alkylenedioxy, hydroxy, nitro, cyano, mercapto, sulfo, sulfino, phosphono, sulfamoyl, mono- $C_{1-6}$  alkylsulfamoyl, di- $C_{1-6}$

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R<sup>3</sup> is (i) a hydrogen atom, (ii) a C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkenyl, C<sub>2-6</sub> alkynyl, C<sub>3-6</sub> cycloalkyl or C<sub>6-14</sub> aryl group which may be substituted by 1 to 5 substituents selected from the group consisting of a halogen, nitro, cyano, hydroxy, an optionally halogenated C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkoxy, amino, mono-C<sub>1-6</sub> alkylamino, di-C<sub>1-6</sub> alkylamino, carboxyl, C<sub>1-6</sub> alkyl-carbonyl, C<sub>1-6</sub> alkoxy-carbonyl, carbamoyl, mono-C<sub>1-6</sub> alkyl-carbamoyl, di-C<sub>1-6</sub> alkyl-carbamoyl, C<sub>6-10</sub> aryl-carbamoyl, C<sub>6-10</sub> aryl, C<sub>6-10</sub> aryloxy and an optionally halogenated C<sub>1-6</sub> alkyl-carbonylamino or (iii) a 5- to 14-membered heterocyclic group containing, besides carbon atoms, 1 to 3 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, which group may be substituted by 1 to 5 substituents selected from the group consisting of a halogen, C<sub>1-6</sub> alkyl, C<sub>3-6</sub> cycloalkyl, C<sub>2-6</sub> alkynyl, C<sub>2-6</sub> alkenyl, C<sub>7-11</sub> aralkyl, C<sub>6-10</sub> aryl, C<sub>1-6</sub> alkoxy, C<sub>6-10</sub> aryloxy, formyl, C<sub>1-6</sub> alkyl-carbonyl, C<sub>6-10</sub> aryl-carbonyl, formyloxy, C<sub>1-6</sub> alkyl-carbonyloxy, C<sub>6-10</sub> aryl-carbonyloxy, carboxyl, C<sub>1-6</sub> alkoxy-carbonyl, C<sub>7-11</sub>

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aralkyloxy-carbonyl, carbamoyl, an optionally halogenated  $C_{1-4}$  alkyl, oxo, amidino, imino, amino, mono- $C_{1-4}$  alkylamino, di- $C_{1-4}$  alkylamino, 3- to 6-membered cyclic amino,  $C_{1-3}$  alkylenedioxy, hydroxy, nitro, cyano, mercapto, sulfo, sulfinio, phosphono, sulfamoyl, mono- $C_{1-6}$  alkylsulfamoyl, di- $C_{1-6}$  alkylsulfamoyl,  $C_{1-6}$  alkylthio,  $C_{6-10}$  arylthio,  $C_{1-6}$  alkylsulfanyl,  $C_{6-10}$  arylsulfanyl,  $C_{1-6}$  alkylsulfonyl and  $C_{6-10}$  arylsulfonyl;

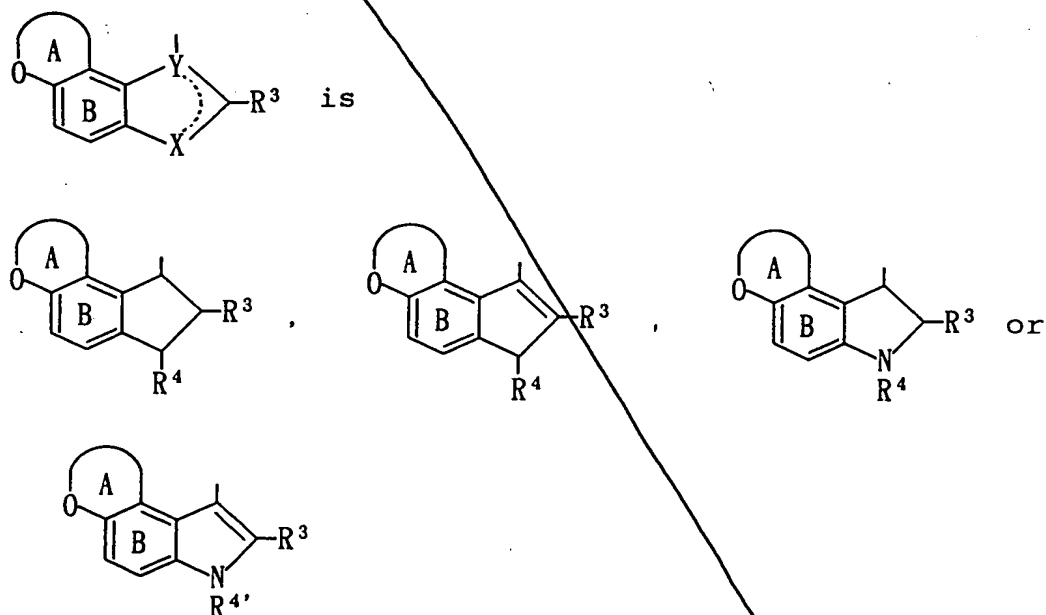
$R^4$  is (i) a hydrogen atom or (ii) a  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $C_{3-6}$  cycloalkyl or  $C_{6-14}$  aryl group which may be substituted by 1 to 5 substituents selected from the group consisting of a halogen, nitro, cyano, hydroxy, an optionally halogenated  $C_{1-6}$  alkyl,  $C_{1-6}$  alkoxy, amino, mono- $C_{1-6}$  alkylamino, di- $C_{1-6}$  alkylamino, carboxyl,  $C_{1-6}$  alkyl-carbonyl,  $C_{1-6}$  alkoxy-carbonyl, carbamoyl, mono- $C_{1-6}$  alkyl-carbamoyl, di- $C_{1-6}$  alkyl-carbamoyl,  $C_{6-10}$  aryl-carbamoyl,  $C_{6-10}$  aryl,  $C_{6-10}$  aryloxy and an optionally halogenated  $C_{1-6}$  alkyl-carbonylamino;

ring A is a 5- to 7-membered heterocyclic group optionally containing, besides carbon atoms and an oxygen atom, 1 to 3 hetero atoms selected from nitrogen atom, oxygen atom and sulfur atom, which group may be substituted by 1 to 4 substituents selected from the group consisting of (i) a  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $C_{3-6}$  cycloalkyl or  $C_{6-14}$  aryl group which may be substituted by 1 to 5 substituents selected from the group consisting of a halogen, nitro, cyano, hydroxy, an optionally halogenated  $C_{1-6}$  alkyl,  $C_{1-6}$  alkoxy, amino, mono- $C_{1-6}$  alkylamino, di- $C_{1-6}$  alkylamino, carboxyl,  $C_{1-6}$  alkyl-carbonyl,  $C_{1-6}$  alkoxy-carbonyl, carbamoyl, mono- $C_{1-6}$  alkyl-carbamoyl, di- $C_{1-6}$  alkyl-carbamoyl,  $C_{6-10}$  aryl-carbamoyl,  $C_{6-10}$  aryl,  $C_{6-10}$  aryloxy and an optionally

halogenated  $C_{1-6}$  alkyl-carbonylamino, (ii) a halogen, (iii)  $C_{1-6}$  alkoxy, (iv)  $C_{6-10}$  aryloxy, (v) formyl, (vi)  $C_{1-6}$  alkyl-carbonyl, (vii)  $C_{6-10}$  aryl-carbonyl, (viii) formyloxy, (ix)  $C_{1-6}$  alkyl-carbonyloxy, (x)  $C_{6-10}$  aryl-carbonyloxy, (xi) carboxyl, (xii)  $C_{1-6}$  alkoxy-carbonyl, (xiii)  $C_{7-11}$  aralkyloxy-carbonyl, (xiv) carbamoyl, (xv) an optionally halogenated  $C_{1-4}$  alkyl, (xvi) oxo, (xvii) amidino, (xviii) imino, (xix) amino, (xx) mono- $C_{1-4}$  alkylamino, (xxi) di- $C_{1-4}$  alkylamino, (xxii) 3- to 6-membered cyclic amino, (xxiii)  $C_{1-3}$  alkylenedioxy, (xxiv) hydroxy, (xxv) nitro, (xxvi) cyano, (xxvii) mercapto, (xxviii) sulfo, (xxix) sulfinio, (xxx) phosphono, (xxxi) sulfamoyl, (xxxii) mono- $C_{1-6}$  alkylsulfamoyl, (xxxiii) di- $C_{1-6}$  alkylsulfamoyl, (xxxiv)  $C_{1-6}$  alkylthio, (xxxv)  $C_{6-10}$  arylthio, (xxxvi)  $C_{1-6}$  alkylsulfanyl, (xxxvii)  $C_{6-10}$  arylsulfanyl, (xxxviii)  $C_{1-6}$  alkylsulfonyl and (xxxix)  $C_{6-10}$  arylsulfonyl; and ring B is a benzene ring which may be substituted by 1 or 2 substituents selected from the group consisting of (i) a halogen, (ii) a  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $C_{3-6}$  cycloalkyl or  $C_{6-14}$  aryl group which may be substituted by 1 to 5 substituents selected from the group consisting of a halogen, nitro, cyano, hydroxy, an optionally halogenated  $C_{1-6}$  alkyl,  $C_{1-6}$  alkoxy, amino, mono- $C_{1-6}$  alkylamino, di- $C_{1-6}$  alkylamino, carboxyl,  $C_{1-6}$  alkyl-carbonyl,  $C_{1-6}$  alkoxy-carbonyl, carbamoyl, mono- $C_{1-6}$  alkyl-carbamoyl, di- $C_{1-6}$  alkyl-carbamoyl,  $C_{6-10}$  aryl-carbamoyl,  $C_{6-10}$  aryl,  $C_{6-10}$  aryloxy and an optionally halogenated  $C_{1-6}$  alkyl-carbonylamino, (iii) an amino group which may be substituted by 1 or 2 substituents selected from the group consisting of a  $C_{1-6}$  alkyl,  $C_{2-6}$  alkenyl,  $C_{2-6}$  alkynyl,  $C_{3-6}$  cycloalkyl and  $C_{6-14}$  aryl group, each of which may be substituted by 1 to 5 substituents selected from the group consisting of

a halogen, nitro, cyano, hydroxy, an optionally halogenated  $C_{1-6}$  alkyl,  $C_{1-6}$  alkoxy, amino, mono- $C_{1-6}$  alkylamino, di- $C_{1-6}$  alkylamino, carboxyl,  $C_{1-6}$  alkyl-carbonyl,  $C_{1-6}$  alkoxy-carbonyl, carbamoyl, mono- $C_{1-6}$  alkyl-carbamoyl, di- $C_{1-6}$  alkyl-carbamoyl,  $C_{6-10}$  aryl-carbamoyl,  $C_{6-10}$  aryl,  $C_{6-10}$  aryloxy and an optionally halogenated  $C_{1-6}$  alkyl-carbonylamino, (iv) a  $C_{1-6}$  alkanoylamino group, (v) a  $C_{1-6}$  alkoxy group which may be substituted by 1 to 3 substituents selected from the group consisting of a halogen, nitro, cyano, hydroxy, an optionally halogenated  $C_{1-6}$  alkyl,  $C_{1-6}$  alkoxy, amino, mono- $C_{1-6}$  alkylamino, di- $C_{1-6}$  alkylamino, carboxyl,  $C_{1-6}$  alkyl-carbonyl,  $C_{1-6}$  alkoxy-carbonyl, carbamoyl, mono- $C_{1-6}$  alkyl-carbamoyl, di- $C_{1-6}$  alkyl-carbamoyl,  $C_{6-10}$  aryl-carbamoyl,  $C_{6-10}$  aryl,  $C_{6-10}$  aryloxy and an optionally halogenated  $C_{1-6}$  alkyl-carbonylamino or (vi) a  $C_{1-3}$  alkylenedioxy group.

3. A compound as claimed in claim 1, wherein

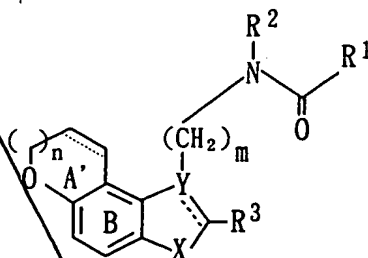


wherein  $R^{4'}$  is an optionally substituted hydrocarbon group and the other symbols are as defined in claim 1.

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4. A compound as claimed in claim 1 which is a compound of the formula:



wherein ring A' is an optionally substituted, oxygen-containing heterocyclic ring;

n is an integer of 0 to 2;

----- and ..... are the same or different and each is a single bond or a double bond;

and the other symbols are as defined in claim 1.

5. A compound as claimed in claim 1, wherein R<sup>1</sup> is

- (i) an optionally substituted C<sub>1-6</sub> alkyl group,
- (ii) an optionally substituted C<sub>3-6</sub> cycloalkyl group,
- (iii) an optionally substituted C<sub>2-6</sub> alkenyl group,
- (iv) an optionally substituted C<sub>6-14</sub> aryl group,
- (v) an optionally substituted mono- or di-C<sub>1-6</sub> alkylamino group,

- (vi) an optionally substituted C<sub>6-14</sub> arylamino group or
- (vii) an optionally substituted 5- or 6-membered nitrogen-containing heterocyclic group.

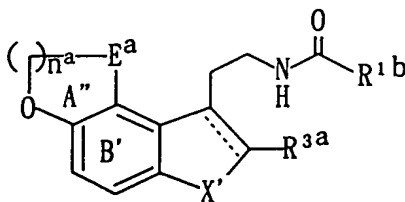
6. A compound as claimed in claim 1, wherein R<sup>1</sup> is an optionally halogenated C<sub>1-6</sub> alkyl group.

7. A compound as claimed in claim 1, wherein R<sup>2</sup> is a hydrogen atom or an optionally substituted C<sub>1-6</sub> alkyl group.

8. A compound as claimed in claim 1, wherein R<sup>2</sup> is a hydrogen atom.

9. A compound as claimed in claim 1, wherein R<sup>3</sup> is a hydrogen atom or an optionally substituted hydrocarbon group.

10. A compound as claimed in claim 1, wherein  $R^3$  is a hydrogen atom.
11. A compound as claimed in claim 1, wherein  $R^4$  is a hydrogen atom or an optionally substituted  $C_{1-6}$  alkyl group.
12. A compound as claimed in claim 1, wherein X is  $CHR^4$ .
13. A compound as claimed in claim 1, wherein X is  $CHR^4$  and ..... is a single bond.
14. A compound as claimed in claim 13, wherein X is  $CH_2$ .
15. A compound as claimed in claim 1, wherein X is  $NR^4$ .
16. A compound as claimed in claim 1, wherein Y is C or CH.
17. A compound as claimed in claim 1, wherein Y is CH.
18. A compound as claimed in claim 1, wherein m is 2.
19. A compound as claimed in claim 1, wherein ring A is a tetrahydrofuran ring.
20. A compound as claimed in claim 1, wherein ring A is unsubstituted.
21. A compound as claimed in claim 1, wherein ring B is unsubstituted.
22. A compound as claimed in claim 4, wherein n is 0 or 1.
23. A compound as claimed in claim 1 which is a compound of the formula:



wherein  $R^{1b}$  is  $C_{1-6}$  alkyl,  
 $X'$  is  $CH_2$ , NH or NCHO,  
 ..... is a single bond or double bond,



$n^a$  is 0 or 1,

ring A" is a 5- or 6-membered oxygen-containing heterocyclic ring which may be substituted by 1 or 2 C<sub>1-6</sub> alkyl optionally substituted by a hydroxy, and ring B' is a benzene ring which may be substituted by a halogen.

24. A compound claimed in claim 23, wherein ..... is single bond and X' is NH.

25. A compound claimed in claim 1, which is  
(S)-N-[2-(1,6,7,8-tetrahydro-2H-indeno[5,4-b]furan-8-yl)ethyl]propionamide.

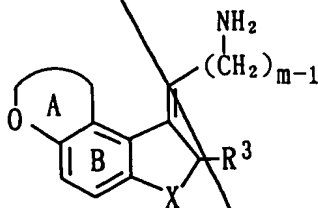
26. A compound claimed in claim 1, which is N-[2-(1,6,7,8-tetrahydro-2H-furo[3,2-e]indol-8-yl)ethyl]propionamide.

27. A compound claimed in claim 1, which is  
N-[2-(1,6,7,8-tetrahydro-2H-furo[3,2-e]indol-8-  
yl)ethyl]butyramide.

28. A compound claimed in claim 1, which is  
N-[2-(7-phenyl-1,6-dihydro-2H-indeno[5,4-b]furan-8-yl)ethyl]propionamide.

29. A compound claimed in claim 1, which is N-[2-(7-phenyl-1,6-dihydro-2H-indeno[5,4-b]furan-8-yl)ethyl]butyramide.

30. A process for producing a compound as claimed in claim 1, which comprises reacting a compound of the formula (i):

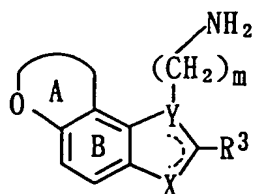


wherein all symbols are as defined in claim 1, or (ii):

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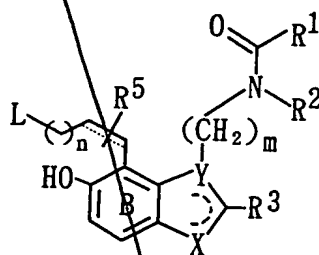


wherein all symbols are as defined in claim 1,  
or a salt thereof, with a compound of the formula:



wherein  $R^1$  is as defined in claim 1, or a salt thereof  
or a reactive derivative thereof, and if necessary,  
subjecting the resultant compound to reduction and/or  
alkylation.

31. A process for producing a compound as claimed in  
claim 4, which comprises subjecting a compound of the  
formula:

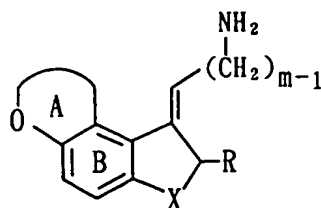


wherein  $R^5$  represents a hydrogen atom, a halogen atom,  
an optionally substituted hydrocarbon group, an  
optionally substituted alkoxy group, a hydroxy group, a  
nitro group, a cyano group or an optionally substituted  
amino group; L represents a leaving group; and the  
other symbols are as defined in claim 4, or a salt  
thereof to cyclization, and if necessary, subjecting  
the resultant compound to reduction.

32. A compound of the formula:

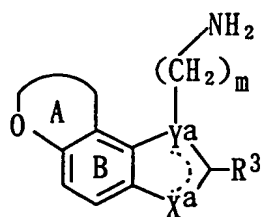
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wherein the symbols are as defined in claim 1, or a salt thereof.

33. A compound of the formula:



wherein  $X^a$  represents  $CHR^{4a}$ ,  $NR^{4a}$ , O or S in which  $R^{4a}$  represents a hydrogen atom or an optionally substituted hydrocarbon group;  $Y^a$  represents C, CH or N, provided that when  $X^a$  is NH,  $Y^a$  is CH or N; and the other symbols are as defined in claim 1, or a salt thereof.

34. A pharmaceutical composition which comprises a compound as claimed in claim 1.

35. A composition as claimed in claim 34 which has a binding affinity for melatonin receptor.

36. A composition as claimed in claim 35 which is a regulating agent of circadian rhythm.

37. A composition as claimed in claim 35 which is a regulating agent of sleep-awake rhythm.

38. A composition as claimed in claim 35 which is a regulating agent of time zone change syndrome.

39. A composition as claimed in claim 35 which is a therapeutic agent of sleep disorders.

40. Method for treating or preventing diseases related to the action of melatonin in mammals which comprises administering to a subject in need a therapeutically effective amount of a compound as claimed in claim 1

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and pharmaceutically acceptable carrier.

41. Use of a compound as claimed in claim 1 for manufacturing a pharmaceutical composition for treating or preventing diseases relating to the action of melatonin in mammals.

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